Assessment of post-disaster distributed infrastructure level-of-service expectations by stakeholders and isolated settlement communities

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hazard rural infrastructure
National Science Challenges RESILIENCE TO NATURE'S CHALLENGES Kia manawaroa – Ngā Ākina o Te Ao Tūroa
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Hazards to distributed infrastructure networks are indirect hazards to isolated settlements, and communities may be affected even if a settlement is not directly impacted.

- Key services are provided to settlements by distributed infrastructure networks (e.g. transport, energy, telecommunications).
- Where there is low (or no) infrastructure redundancy, damage to a network (at any point) can result in the remainder of the network becoming non-functional.
- Infrastructure networks are also interdependent, so damage to one network will likely impact other services.

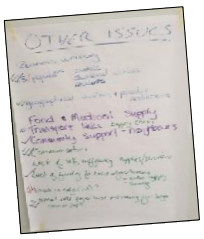
To reduce community risk, this project aims to assess post-disaster level-of-service expectations by infrastructure providers and communities, and how to effectively communicate level-of-service expectations between infrastructure providers and communities.

- Infrastructure providers (in association with government agencies) decide post-disaster infrastructure planning, but often without an understanding of the minimum levels-of-service isolated settlements require to function.
- Communities are also often unaware of infrastructure provider post-disaster level-of-service provision expectations, to the detriment of proactive disaster risk management and emergency response plans, which can cause communities to be insufficiently prepared.

Methodology: co-creating impact scenarios

Impact scenarios and recovery management strategies will be co-created by infrastructure stakeholders and community members to integrate knowledge.

Franz Josef Glacier township, and so infrastructure in the West Coast of the South Island, are being studied to align with Franz Josef Resilience Workshops: a participatory initiative led by the community, since 2015.



Impact scenarios will be co-created from two hazard scenarios:

- Project AF8's Mw 8.2 Alpine Fault rupture.
- A moderate West Coast region earthquake.

Infrastructure stakeholder workshops

NZTA | CDEM | Electronet

- Discuss emergency management strategy for impacts scenarios.
- Identify limits of response resources.
- Extend distributed infrastructure impacts scenario through time.

Franz Josef community Resilience Workshop 1

- Discuss emergency management strategy for impacts scenarios.
- Identify limits of community resources.
- Discuss post-disaster (recovery) strategies for Franz Josef.

Franz Josef community Resilience Workshop 2

Also attended by NZTA, Electronet, CDEM

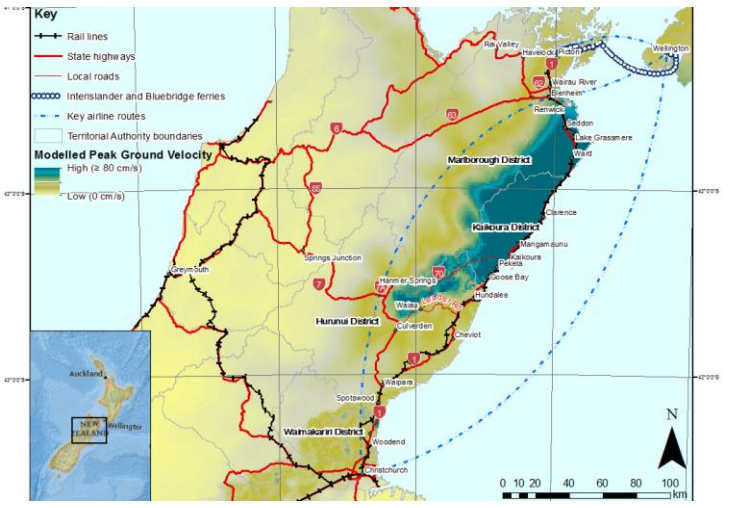
- Step through extended infrastructure impacts scenario
- Discuss and adjust this scenario within the Resilience Workshop.

Transport infrastructure performance and management in the South Island of New Zealand, during the first 100 days following the 2016 Mw 7.8 "Kaikōura" earthquake (Davies et al., 2017).

From the national and regional economy perspective, **the "Kaikōura" earthquake impacts were severe due to the damage to distributed infrastructure, and particularly transportation networks. This paper details direct and indirect impacts of the "Kaikōura" earthquake on South Island transport infrastructure, and the subsequent management through the emergency response and early recovery phases**, including 100 days of post-earthquake level-of-service mapping for roads, commercial flights, ferries, rail, and shipping.

Lessons learned:

- Cross-network interdependencies and service provider adaptability ensured continued regional transport of goods and people from Day 1.
- Effective response to regional transport challenges allowed Civil Defence Emergency Management to quickly prioritise access to isolated settlements. However, settlements were without road access for 23 days, at odds with national advice to store 7 days of emergency supplies.
- There is need for:
  - well-practiced, efficient responses;
  - major strengthening along critical transport routes;
  - high-functioning alternative route redundancy, which can perform if another route or line is damaged.



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